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DISCUSSION

Dr M. Schermerhorn (*Boston, Mass*): We've known that men and women are different for a while now. There is a lower prevalence of aneurysms in women, they tend to occur later in life, and they've got a higher rupture risk at any given diameter, and women typically live longer than men. Your analysis has discovered some important additional differences.

Why do you think there is this perioperative mortality difference between men and women? With many vascular surgical procedures we've assumed it's because of smaller arteries, but I'm not sure that holds true for an aortic tube graft.

Since women are supposed to live longer than men, why don't they after an aortic aneurysm repair?

As you showed, the EVAR-1, DREAM, and our prior Medicare analysis, showed the survival curves coming together after just a couple of years and we've heard many theories as to why this happens. Your analysis forces us to re-think these theories and I'd like to get your thoughts on why the curves come together in the men and why don't they come together in the women.

Finally, I'd like to thank you for highlighting that we all need to start thinking about the potential for gender disparities in other procedures as well.

Dr Egorova: As we all know, large data set analysis generates new hypotheses that can be verified in future clinical studies. The current analysis showed that women compared to men had higher

perioperative mortality. The long-term survival was worse for women after elective open repair and emergent repair of ruptured AAA. The reasons for these gender disparities are not well understood but certain hypothesis can be made.

Answer to question 1. Similar to any kind of vascular reconstruction, immediate mortality after AAA was higher for women than for men. We think that vascular anatomy (smaller arteries) and devices not made to fit female anatomy play significant role. But we agree that there are other not well understood factors responsible for the higher mortality in women. One possible explanation is that women tend to have unrecognized cardiovascular disease and other, not well identified risk factors preoperatively and thus are not as well optimized as their male counterparts before the surgery. There is ample literature suggesting that cardiovascular disease in women is more likely to be under-diagnosed, and when recognized, women are less likely to be on aspirin, beta-blockers and statins. Lack of aggressive treatment of cardiovascular disease may contribute to higher mortality after procedures but, obviously, further research is needed to give all the answers.

Answer to question 2. We also observed a difference in long-term survival between men and women. It is well-known that women live 6-7 years longer and should be able to catch up to men in the long-term despite the initial perioperative disadvantage. And they do after elective EVAR when the survival curves of men and women coincide 2 years after surgery. The different pattern of survival was observed after elective open repair and repair of ruptured AAA. The survival curves remained parallel for the entire follow-up period with better survival for men. One speculation is that these procedures, as opposed to elective EVAR, cause significantly more stress to women. The recovery is more difficult and prolonged, and women are less likely than men to return to their preoperative level of function. In addition, women usually do not have the same level of socioeconomic support compared to men of the same advanced age. In fact, studies have shown that after any vascular procedure women are less likely than men to return home and are more likely to end up in an extended care facility. Level of function and long-term institutionalization influences significantly long-term survival. Again, we think that there are many other parameters that cause such sustained discrepancy between genders and would like to explore more of these findings in the future papers.

Answer to question 3. Finally, we observed small but sustained difference in survival for 6 years between women undergoing open repair and women undergoing EVAR, favoring EVAR. Differences in functionality after the two procedures probably play some role in this finding. However, we are very curious to see if other authors utilizing different databases will replicate our observations and we are eager to further investigate this finding by analyzing causes of death and diagnoses at readmissions after the two procedures.